Once-Reluctant I.B.M. Makes Inroads In the Precollegiate-Education Market

By Peter West

The International Business Machines Corporation has begun to aggressively target the school classroom, a market that even its spokesmen concede was once virtually ignored and left to competitors.

I.B.M. has almost tripled its sales of instructional computers in recent years, according to market analysts, and has moved into second place behind the field's long-dominant leader, Apple Computer Inc.

By one estimate, I.B.M. will have increased its share of the market by more than 156 percent between 1986-87 and the end of this school year—a feat characterized by a commercial tracking firm as "the most striking growth of all manufacturers in market penetration."

While no one is predicting that the I.B.M. surge will soon threaten Apple—a company that accounts for almost two-thirds of the classroom computers in use in the United States—some are noting that a confluence of forces is making the school-computer market a highly volatile one.

And I.B.M., whose market inroads include some of the nation's largest school districts, appears to be ready to exploit that volatility.

"The word is getting out that I.B.M. has its act together in the education market," said Charles E. Steele, the area manager for I.B.M. Educational Systems in New York. "We'd like to be the vendor of choice"

Competition Heats Up

The appearance of a new player in the field also is welcome news for some school computer professionals.

"I have a real problem that one company has dominated, so to speak, the educational market. I think that fosters a lack of creativity," said Marilyn Gardner, director of technology development for the 59,000-student Boston school district. "I've seen that with Apple, they've kind of sat back on their heels."

Boston has made a large commitment to I.B.M. on the basis of its "educational support," she added, noting that the appearance of different types of computers in the classroom "has made our teachers a little more flexible when it comes to technology."

Spokesmen for Apple, however, pointed to a recent company survey indicating that it continued to increase its share of the market, among 5,000 selected schools, from the low 60 percent range to the high 60's during the 1987-88 school year.

That survey found that I.B.M.'s share of the market in those schools dropped during the same period, said Sandra Bateman, a representative in Apple's K-12 division. On the other hand, 90 percent of the 5,000 schools polled by the Sealed Research Corporation had at least one Apple computer.

But James Dezell, general manager of I.B.M. Educational Systems, is unfazed.

Managers in his 12 regional markets are using a coordinated sales program that concentrates on such popular products as the "Writing to Read" program and volume discounts to customers who buy in bulk. They also offer districts help in developing long-range plans to meet technology needs and training programs conducted by teachers for teachers.

Apple has a similar commitment to educators, its officials point out, including grants to needy schools, a network of former educators who serve as regional advisers, and other computer-literacy programs.

Spokesmen for both companies, however, noted that increased computer savvy among their school customers has been a major factor in improving sales.

"We find our users are much more sophisticated,' said Ms. Bateman of Apple.

According to I.B.M.'s Mr. Steele, "You've gotten a maturing of these customers and a better understanding of what the technology can do."

Room for Growth

Spokesmen for the two companies also agreed that there is ample room for growth in the precollege market.

One indicator is that, despite the fact that the preponderance of computers already installed in schools bear the Apple brand name, I.B.M. was able to "almost double its market share in sales, taking 22 percent of 1986-87 sales," according to "The K-12 Market for Technology and Electronic Media," published by Link Resources of New York.

The Link information was based on responses received from an October 1987 mailing of 5,000 surveys to principals nationwide. The principals were asked to provide certain financial data, then pass the questionnaires along to teachers "most involved" in instructional computing.

"Now that I.B.M. has a machine specifically designed for the school market in the Model 25, it can be expected to be even more aggressive in the pursuit of K-12 sales," the report on the Link survey indicates.

According to Mr. Steele, the company aspires to be a major force in lowering the ratio of students to computers from its present level of approximately 30 to 1 to perhaps as low as 4 to 1.

Peggy Bruckner of I.B.M. suggested that the ideal ratio for her general manager, Mr. Dezell, would probably be "two computers for each student"—one to use at school and one at home

But Mr. Steele conceded that to achieve a school ratio in the 4-to-1 range, "a realistic time frame, to me personally at least, is five years."

Important Choices

The stakes for educators in the increasing competitiveness of the technology market may be considerable, according to observers. They note that choice of brand in computer-buying will remain significant as long as an incompatibility between machines makes using them in tandem difficult.

Software for I.B.M. equipment, for example, uses the business standard MS-DOS operating software, which cannot readily be used on Apple equipment.

Researchers are working to achieve compatibility between MS-DOS and other program formats, with some products already available. And both I.B.M., which has its own educational-software division, and Apple, which is spinning off a software-producing company called Claris, are working to produce high-quality programs for their own machines.

But for school districts, which make large-scale acquisitions of software, compatibility remains an an important factor in computer purchases.

According to Jeanne Hayes, the editor of "Microcomputer and V.C.R. Usage in Schools," published by Quality Education Data of Denver, selecting machines by brand will become increasingly important now that—as the company's survey states—"the use of microcomputers in schools has become institutionalized."

"Schools now have enough hardware that the cost of software is becoming significant" to them, she said.

According to a spokesman for Link Resources, "there really are only two computers now in the educational market, Apple and MS-DOS."

Aging Equipment

Of equal importance is the fact that some school computers now in

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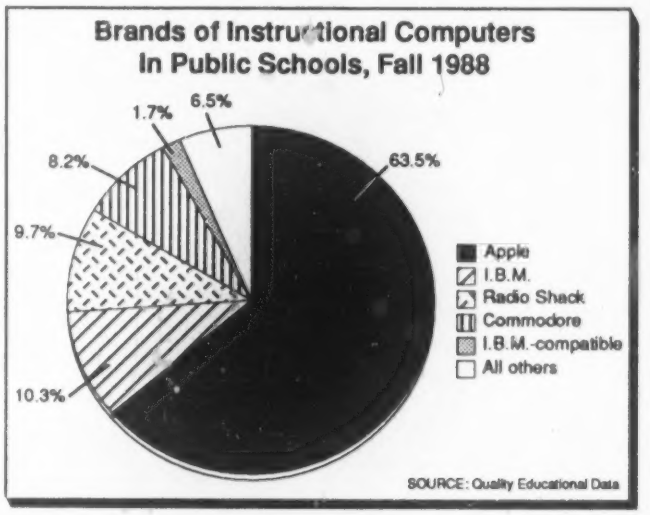


Classroom Advertiser To Send Its Message Over Television

By Mark Walsh

The company that pioneered the placement of advertiser-supported wall posters in American schools is now targeting students with the most powerful medium of all—television.

Whittle Communications, a Knoxville, Tenn., company known for its media innovations, last week announced plans to test a daily 12-minute news program that would be beamed into high-school classrooms via satellite.

The company plans to provide a satellite receiver, videocassette recorder, and television monitors for free to five or six pilot schools, with costs of the venture covered by the sale of two minutes of air time per program to national advertisers.

If all goes well with the test this spring, Whittle envisions selling the idea to the nearly 20,000 high schools in the United States. The projected teenage audience would be 6.5 million in the first year.

"Schools have an enormous need for technology and programming," said Christopher Whittle, chairman of the company. "The only place the funding for that is going to come from is the business community."

Blatant 'Commercialization?'

The proposed introduction of advertiser-supported television into American classrooms has prompted criticism, however, from educators and others who see it as inappropriate.

"This is something that school systems should fight tooth and nail," said Peggy Charren, president of the watchdog group Action for Children's Television. "This is the first time I have seen commercialization of education so blatantly."

One of the major attractions of the concept for schools could be Whittle's plan to donate to each participating institution an estimated $50,000 worth of electronic equipment. The hardware would enable participants to receive the program and broadcast it on monitors throughout the school.

William J. Gubbins, vice president of Whittle, estimated that schools would get approximately one television monitor for every 23 students.

"That means pretty much one in every classroom," he said. The schools would receive the program by satellite each night. Then the principal or teachers could screen it before showing it to students. If they deemed a portion inappropriate, they would be free not to show the program that day.

The schools would also be able to use the closed-circuit television system provided by Whittle to show other educational programming.

The plan, called innovative, may also be controversial.

"We have looked long and hard at this, and there is no other way to pay for the technology without advertiser support," Mr. Gubbins said.

Fast-Paced News Video

The program, to be called "Channel One," will be a cross between NBC's "Today" show and MTV, company officials said. Youthful anchors will introduce fast-paced reports about world and national affairs tailored to a teenage audience.

"Every effort will be made to connect news events to the lives of young people," said Mr. Gubbins. For example, a story about tensions in the Middle East, he said, might show the relationship to higher gas prices for American teenage drivers.

Features such as "fast facts" ("arachibutyrophobia is the fear of peanut butter sticking to the roof of your mouth"), and pop-quiz questions will be interspersed between the longer reports and the two minutes of advertising, which the trade magazine *Advertising Age* says is likely to include spots from McDonald's, Converse, and the U.S. Army.

Ads for alcoholic beverages, cigarettes, and condoms are among those that would not be accepted for the program, company officials said.

The program will be produced by Susan Winston, a veteran of morning television programs on both CBS and ABC.

'Serving as a Lab'

The $5-million test of "Channel One" will begin March 6. Some 8,000 to 10,000 students at five or six schools will see original editions of the program every day for five weeks.

Stan Jasinskas, principal of Eisenhower Middle School in Kansas City, Kan., one of the pilot schools, said the program will be shown when students are in their morning 25-minute study hall.

"We're serving as a lab," he said. "We're going to monitor it. We haven't surrendered any kind of curricular decisions."

Mr. Jasinskas said he was not concerned about commercial television creeping into the classroom setting. "Some think of commercials coming into the building as evil," he said. "But I think we can use them as an educational tool."

If it works as intended, the program should stir interest among students in current affairs, the principal predicted.

"Rarely is a kid going to turn on '60 Minutes,' " he said. "They are going to go for more couch potato stuff. The idea of this is to try to train them to be more responsible in their TV viewing."

Advertising vehicles produced by Whittle are already a familiar sight in more than 10,000 schools. The company developed the concept of wall media—poster-sized "magazines" placed on school walls, with news and information of interest to students and several panels of advertising. *(See Education Week, Oct. 19, 1988.)*

Whittle's "Big Picture" wall poster is published 10 times a year for elementary-school students, while "Connections" reaches high schools 14 times a year. The company also distributes *GO! Girls Only*, a magazine for junior-high-school girls.

Continued from preceding page

use are aging, according to a survey of 860 school computer and video coordinators conducted last June by Q.E.D.

Drawing on the 113 responses collected, Q.E.D. concluded that "more than half of the computers in the survey are between 3 and 4 years old, suggesting a need for capital expenditures for replacement equipment in the near future."

According to figures compiled by Link Resources, Apple computers accounted for 60 percent of the 458,000 units sold during the 1986-87 school year.

I.B.M., however, was second with 22 percent of overall sales, according to the survey, with Tandy following as a distant third, accounting for 14 percent of the new computers sold.

Of the 2.03 million computers in use in the schools during that year, I.B.M. accounted for 11 percent of the 1.68 million in public schools and 10 percent of the 345,000 in private schools.

Large-District Sales

Q.E.D., which annually surveys all U.S. public and private schools by telephone, has found that I.B.M.'s successes fall disproportionately in the 173 largest school districts, where it often has already established a considerable presence in administrative uses of computers.

Its latest report says that the company has "almost twice its normal market share in these 173 largest districts, reflecting I.B.M.'s aggressive placement of micros in such large districts as Boston and Washington."

That market, Q.E.D.'s research indicates, is a particularly lucrative one.

"These 173 districts, with more than 11 million students, have 30 percent of the current U.S. installed computer base," according to the study.

Q.E.D.'s listing of districts by market share indicates that in some school systems, there were 10 times as many I.B.M. machines as those of its competitors.

The company's Mr. Steele explained this by saying that "the larger the account, the more resources [there are applied]."

In many cases, he said, large districts, or consortia composed of smaller districts, are offered discounts as high as 40 percent over normal retail prices to buy I.B.M. equipment.

In the District of Columbia, for example, 2,200 of the 3,845 microcomputers in use were I.B.M.-manufactured, compared with 75 Apples, 670 Commodores, 500 Ataris, and 400 unnamed brands.

Jenelle V. Leonard, director of computer-literacy training for the district, said compatibility was a factor in maintaining the system's preponderance of I.B.M. equipment. The district awarded a contract to I.B.M. in 1985, she said, and decided to continue its commitment to MS-DOS machines last March, when another open bid for computers was awarded.

In awarding bids, she pointed out, "you look at the performance record and you look at the compatibility in the schools."

Market Volatility

Another district with a large investment in I.B.M. equipment is the Plano (Tex.) Independent School District, which reported that 3,040 of its 4,373 computers were manufactured by I.B.M. The district also owns 1,200 Apple machines.

But Bill Adkins, director of instructional technology for the 28,000-student school system, praised Apple's machines as highly durable and said that the major factor that weighed in favor of purchasing I.B.M. products may be changing in the volatile climate of the microcomputer industry.

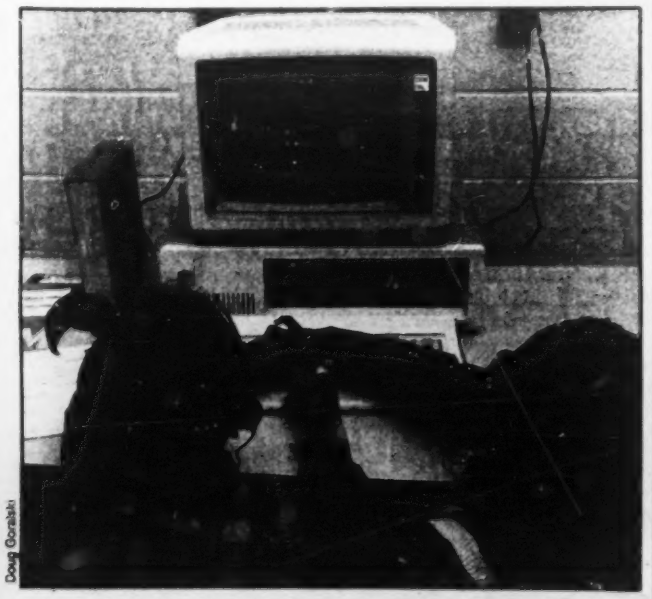
When the decision was made two years ago, he said, the district was embarking on a long-range plan to link its computers in a network that would, by 1992, connect all of its schools, administrative offices, and computer laboratories.

"It didn't boil down to actual hardware studies," Mr. Adkins said. "It was the total system that we were looking at at that time. I.B.M. was the company that had the networking."

The district will soon purchase more computers for its instructional program. And while I.B.M. products have been "satisfactory," Mr. Adkins said, Apple has recently announced a networking system of its own—"Apple Talk"—that may fit the bill just as well.

Ms. Leonard added that although the Washington schools have made a substantial commitment both to I.B.M. and to MS-DOS, the computer market is unpredictable and the next round of purchasing may produce different results.

"Each time, it becomes a new ball game," she said, "because it really depends on what the state of the art is then."



Doug Goralski

School officials hope that their programs will benefit from stepped-up competition in the volatile market for instructional computers.

COMPUTERS

The Intel Corporation has established a new foundation to encourage precollegiate educators and students to emphasize "basic literacy" in science and mathematics.

The foundation, which went into operation earlier this month, is seeking constructive suggestions from educators about ways to accomplish its goals.

"We are looking for opportunities and ideas that the schools might bring to us," said Toni Barrientos, a spokesman for the foundation.

Intel, a California-based manufacturer of computer components, hopes to use the new foundation to enable a wide range of students, including those whose formal education may end with high school, to discover career opportunities in the technical disciplines.

"These kinds of informational skills are not just for the college-bound, because there is a shift in opportunities" in these fields, she observed.

Ms. Barrientos noted that at least one of the company's branches has fostered an adopt-a-school program. "We hope to do that kind of thing more extensively," she added.

She also suggested that programs that offer "summer-enrichment opportunities" for students could receive favorable consideration for grants.

In addition, the foundation wants to foster "innovative programs" that "encourage teachers to stay in teaching, particularly in the sciences," Ms. Barrientos continued.

Applicants are not required to use computers in their instructional programs in order to be eligible for grants, she added.

The foundation proposes to focus its efforts on Arizona, California, New Mexico, and Oregon, where the corporation has major installations, Ms. Barrientos said.

It will accept applications for grants throughout the year, though Ms. Barrientos declined to say how much grant money is available.

Copies of the guidelines governing applications for grants are available from the Intel Foundation, 5200 Northeast Elam Young Parkway, Hillsboro, Ore. 97124-6497.

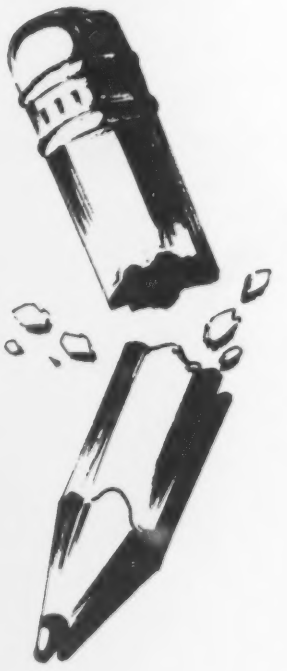
■

G.T.E. Education Services Inc., a division of G.T.E. Information Services, based in Tampa, Fla., has signed an agreement to transmit ED-LINE, an education-related electronic news service published by the National School Public Relations Association.

ED-LINE, which includes such services as "Legal Briefs," "Teacher Talk," and "Ruraline," will be transmitted over the G.T.E. Education Network, which is available to more than 7,000 precollegiate educators across the country.

Those who presently subscribe to ED-LINE will automatically be transferred to the G.T.E. network by the end of the month. —P.W.

The Size Of Some Classes Has Made Teaching A Snap.



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This Week's Forum: Page 27

EDUCATION WEEK

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Education Is Key In War on Drugs, President Says

Faces Fire on Decision On 'Drug Czar' Status

By Julie A. Miller

WASHINGTON—In one of his first interviews as President, George Bush last week said the drive to eliminate drug abuse would succeed "only if our education is successful."

The Administration's efforts, he said, will focus on urging "all elements in our society to participate in the fight on drugs."

But even as Mr. Bush was speaking to reporters, criticism was building on Capitol Hill over his apparent decision not to make his new "drug czar," former Secretary of Education William J. Bennett, a formal member of the Cabinet. Lawmakers argued that the decision sends the wrong message about the importance of the war on drugs.

In fact, the sentiments expressed by the President last week seemed to dovetail with

Continued on Page 16

Court Bars City 'Set-Aside' Policy Based on Race

School Districts Advised To Review Similar Plans

By Nancy Mathis

The U.S. Supreme Court's decision invalidating a Richmond, Va., set-aside program for minority contractors casts a legal shadow over similar programs operated by school districts nationwide, experts said last week.

Even those plans that use flexible goals instead of mandated quotas may not be exempt from the "strict scrutiny" of the courts, lawyers contended.

Several school officials interviewed in the wake of the High Court's Jan. 23 decision in *City of Richmond* v. *J.A. Croson Company* said they believed their affirmative-action programs for minority contractors and vendors would pass a constitutional test because their policies call only for a "good faith" effort to achieve minority-participation goals.

Lawyers, however, said that while using flexible goals instead of strict quotas may provide some protection, such affirmative-action programs could still be targeted for

Continued on Page 22

"The purpose of strict scrutiny is to 'smoke out' illegitimate uses of race by assuring that the legislative body is pursuing a goal important enough to warrant use of a highly suspect tool."

—Sandra Day O'Connor

Excerpts from ruling on page 20.

Sets Stringent Test for Discrimination Remedies

By Tom Mirga

WASHINGTON—The U.S. Supreme Court voted 6 to 3 last week to limit the ability of school districts and state and local governments to require that minority-owned businesses receive a set percentage of their construction contracts.

Also in its Jan. 23 decision striking down a Richmond, Va., public-works policy, a majority of the Court's members agreed for the first time to hold state and local rules that give minority groups preferential treatment over whites to the same standard of "strict scrutiny" used to judge policies that favor whites over minorities.

Legal experts differed last week on the ramifications of the decision for public schools. While most agreed that the ruling in *City of Richmond* v. *J.A. Croson Company* (Case No. 87-998) will directly affect contract "set asides" for minority-owned businesses, there was less consensus on its probable effects on racially motivated hiring, transfer, and promotion policies.

Continued on Page 17

In North Carolina, Career-Ladder Plan Nears a Crossroads

By Lynn Olson

North Carolina's governor and the state affiliate of the National Education Association are headed toward a major battle over the future of the state's ambitious and controversial program for paying teachers based on performance.

The state's Career Development program, now operating in 16 districts, is in its fourth and final year as an experimental venture.

Lawmakers must decide whether to expand it and make a longterm commitment of additional funding or maintain its current scope and risk running out of steam.

Both Gov. James G. Martin and the state board of education would like to take the program statewide. But local presidents of

Continued on Page 14

U.S. Seeks To End Racial Teacher-Assignment Practice

By William Snider

WASHINGTON—School districts that voluntarily maintain policies assigning teachers to schools on the basis of their race violate federal equal-protection laws, the U.S. Justice Department argues in a new lawsuit.

The case, filed last week against the Prince George's County (Md.) school system, could have ramifications for the hundreds of other districts believed to operate under similar policies, civil-rights experts said.

The Justice Department argues, as it has in recent cases affecting employee hiring, promotions, and layoffs, that the Prince George's faculty-assignment plan should have been dismantled immediately after its initial purpose was fulfilled.

Such plans were typically adopted by districts—under pressure from the federal government or the courts—to ensure that schools were not racially identifiable based on the composition of their faculty.

But many school officials now argue that efforts to maintain racially balanced school faculties serve a valid educational purpose: helping to prepare students for life in a multi-ethnic, pluralistic society.

The Prince George's case is the first filed by the Justice Department on this issue. It is seen by many as a test case that could ultimately determine what latitude school officials may exercise in their efforts to maintain racially balanced staffs at individual schools.

Some experts speculated that most such plans could not withstand the "strict scrutiny" standard adopted by the U.S. Supreme Court in its rejection last week of a Richmond, Va., policy that awarded minority businessmen 30 percent of all public-works contracts.

Continued on Page 23

Also in the news

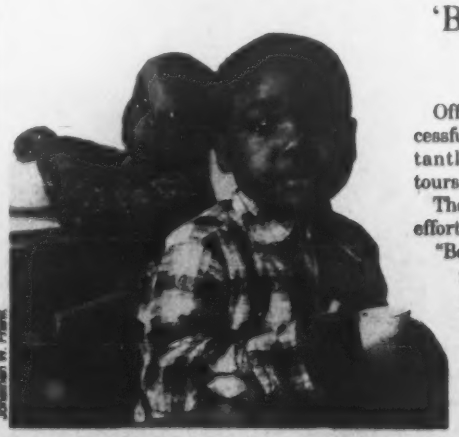
5 **Boosting Mathematics**
The National Academy of Sciences calls for fundamental revisions at all levels of education—and for greater school use of calculators.

8 **'Legalizing' a Profession?**
Connecticut rejects an independent licensing body, but New York is studying a professional-standards board with a teacher majority.

Reform at 5: The Unfinished Agenda

'We Became the Hopes and Dreams' of All

'Beethoven' Staff Pushing On Amid Intractable Ills



Jonathan W. Frank

By Deborah L. Cohen

Officials at Chicago's Center for Successful Child Development have reluctantly decided to stop giving press tours.

The widely praised early-intervention effort—known more commonly as the "Beethoven Project"—had been scrutinized so intensively during its first year of operation, they say, that the attention became "a double-edged sword." Not only did the center's constant flow of visitors interrupt work and anger some program participants, but the news coverage itself, the officials suggest, created a problem.

It raised unrealistic expectations.

"We became the hopes and dreams of all policymakers, all disciplines," said Gina Barclay-McLaughlin, the program's executive director. "We have isolated ourselves recently so we can do what we want to do."

What the project administrators want to do has proved to be a more formidable undertaking than even they had imagined, they freely admit.

It is to improve—by means of a range of social, medical, and educational

Continued on Page 6

IN SUMMARY

Setback for 'Equal Access'
A federal appeals court has ruled that student prayer or Bible-study meetings on school grounds violate the separation of church and state mandated by the U.S. Constitution. **Page 4.**

Georgia Desegregation Ruling
The U.S. Justice Department is entitled to a ruling on whether school districts involved in longstanding desegregation cases have achieved unitary status, a federal judge has held. **Page 4.**

Bayh's Unity Plea
Gov. B. Evan Bayh 3rd of Indiana has called on his state's political leaders to "reject the partisan posturing of the past" and work together to help improve the public schools. **Page 9.**

Choice Drive Renewed
Gov. Tommy G. Thompson of Wisconsin has asked legislators to consider a new version of his proposal to give parents greater choice in the selection of their children's schools. **Page 10.**

Bending Bush's Ear
John Sculley, head of Apple Computer Inc. and chairman of an educational advisory panel, met last month with George Bush to suggest ways to enhance the federal role in education. **Page 15.**

Another Round on Day Care
The day-care debate has begun again on Capitol Hill, as a Senate hearing last week considered a proposal authorizing $2.5 billion to subsidize child care for low-income families. **Page 15.**

Books	25
Commentary	24 and 36
Deadlines	28
Events	28
Grants	28
Legislative Update	10
Letters	24
Marketplace	29

FORUM
Switching Labels: From Vouchers to Choice
Statement on Page 27

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ACROSS THE NATION

NATIONAL

P.B.S. Creates Advisory Panel On K-12 Educational Services

The Public Broadcasting Service has established an advisory panel of educators and broadcasters for its elementary/secondary service.

Committee members, chosen by their respective institutions, will try to identify educational needs that public television and instructional technology can fill, P.B.S. officials said in announcing the creation of the new panel.

Included on the 26-member committee are representatives of major education groups, members of the P.B.S. board of directors, officials of national and regional public-television organizations, and public-television station managers.

Among the prominent educators named to the group are Gregory R. Anrig, president of the Educational Testing Service; Gordon Cawelti, executive director of the Association for Supervision and Curriculum Development; and Jerry L. Evans, state superintendent of public instruction for Idaho.

■ **The next civilian to fly on a space shuttle will be a teacher,** the National Aeronautics and Space Administration has reaffirmed.

Once the agency's "backlog of high-priority missions" has been reduced and the shuttles' capability for "safe, reliable operation" has been proven, NASA officials said in a statement Jan. 12, "first priority will be given to a 'Teacher in Space' in fulfillment of space-education plans."

The agency has received numerous queries about the status of plans to put a teacher and a journalist into space, officials said.

Civilians were barred from such missions after the shuttle Challenger, carrying Sharon Christa McAuliffe, a high-school teacher from Concord, N.H., and a crew of six professional astronauts, exploded on Jan. 28, 1986.

Barbara R. Morgan, an elementary-school teacher from McCall, Idaho, who was Ms. McAuliffe's backup, is awaiting her chance to fly when NASA issues the call, said Pamela Bacon, coordinator of the Teacher-in-Space program. "She has always wanted to do it and she still does," Ms. Bacon said last week.

STATES

Two State Courts Back Limits On Regulation of Church Day Care

Courts in Missouri and Minnesota have issued rulings limiting the power of the states to regulate religiously affliated child-care programs.

In Missouri, Circuit Judge Robert H. Dierker Jr. held that state laws exempting church-affiliated day-care centers from licensing regulations were constitutional and a "reasonable accommodation" of the First Amendment right to freedom of religion.

The Child Day Care Association of St. Louis had challenged the exemptions, arguing that they gave church-related centers a competitive advantage over other programs.

The Minnesota case concerned a year-long effort by state officials to require a church-run preschool in Marshall to obtain a license as a day-care center.

District Judge George Harrelson declared that the state's move to make the church's program meet requirements for day-care centers was "vague and unconstitutional."

Judge Harrelson also recommended that the legislature clarify the state's definition of programs subject to licensing requirements, in order to offer "additional protection to the religious freedom of all Minnesotans."

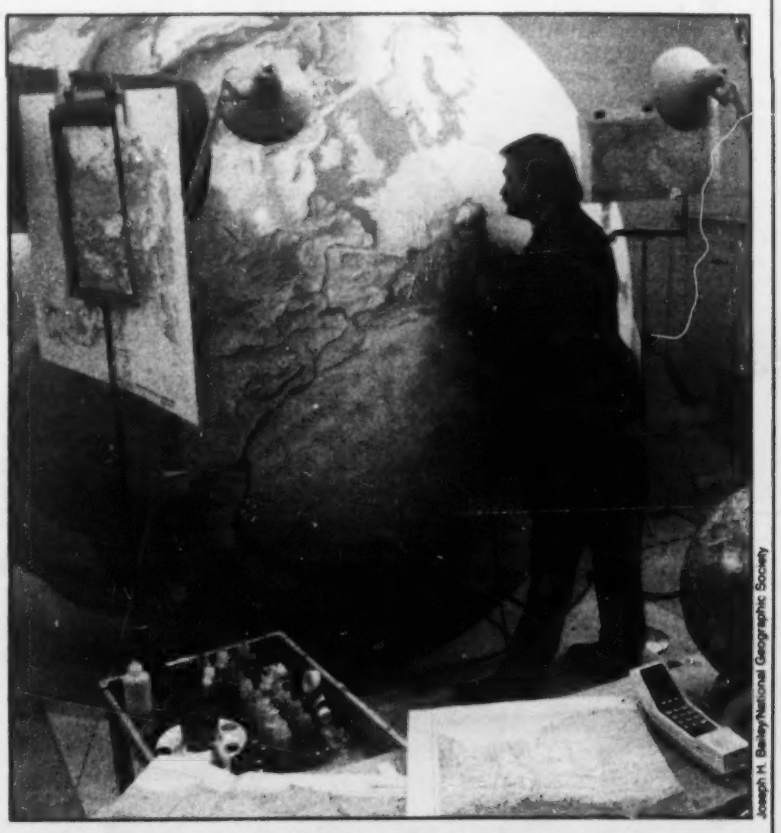
The U.S. Supreme Court last month declined to review a ruling that upheld a Virginia law exempting church-run child-care centers from compliance with health and safety regulations. *(See Education Week, Jan. 25, 1989.)*

■ **Trustees of the Florida School for the Deaf and Blind have rejected a proposal to have the troubled facility licensed by the state department of health and rehabilitative services.**

The proposal was one of 101 made by the department in a report written in the wake of a 9-year-old deaf and mentally handicapped pupil's death by scalding last year.

Instead, the board, which is not responsible to any state agency, voted to hire a consultant to study the cost of meeting licensing standards.

A Whole New World



Joseph H. Bailey/National Geographic Society

A cartographic artist works on an 11-foot globe installed last month at the National Geographic Society's headquarters in Washington, D.C. The sphere is the centerpiece of a new, high-technology exhibit on geography and weather.

DISTRICTS

Texas Court Blocks Drive For School-Tax Rollback

A Texas district-court judge has blocked the efforts of a citizens' group to force the Lake Worth Independent School District to roll back tax rates and provide refunds to taxpayers.

District officials had warned that they might be forced into bankruptcy if required to return the estimated $1 million in tax revenues.

The group, the Committee for Responsible Leadership, had gone to court seeking an election to overturn property-tax increases implemented by the district in 1987. The 1,400-pupil district had raised its tax rate by 32 percent in what officials described as an effort to fund changes mandated by the legislature, such as teacher pay raises and lower teacher-student ratios.

Judge Scott McCown dismissed the case because the district did not have the resources to refund the taxes and because delays in bringing the matter to court had nullified the issues involved, explained Randall Wood, a lawyer representing the district.

Residents fighting the tax increase should have tried to get a temporary injunction before taxes were collected under the new rates, the judge said.

■ **Cleveland students who graduated last June earned more than $200,000 under an unusual scholarship program.**

The district's program, which began in February 1988, gives students scholarship money for good grades. An A is worth $40, a

Academy Urges Nation To 'Wake Up' And Revamp Mathematics Education

By Robert Rothman

WASHINGTON—With a dramatic plea for the nation to "wake up" to the need to address the impoverished mathematical abilities of its young, the National Academy of Sciences last week called for a sweeping overhaul of the way the subject is taught at all levels of education.

Among its recommendations for elementary and secondary schools is a controversial proposal that teachers make greater use of hand-held calculators as a way of helping their students keep pace with a "mathematical revolution" that favors the logic of problem-solving over purely computational skills.

The report by the academy's National Research Council warns that failure to correct existing educational deficiencies will have social as well as economic consequences.

"We are at risk of becoming a divided nation in which knowledge of mathematics supports a productive, technologically powerful elite while a dependent, semiliterate majority, disproportionately Hispanic and black, find economic and political power beyond reach," it says.

Although reform is needed in much of the education system, the report notes, math is particularly crucial because of its central role in preparing students for job opportunities and in developing their thinking skills.

Despite this importance, however, most Americans lack the mathematical literacy needed for the future, the report asserts. Three-fourths of all students stop studying the subject before completing prerequisites for college- or career-level work, it maintains, and international comparisons have shown that the achievement level of U.S. students lags far behind that of other countries.

These trends have developed in large part, the study contends, because schools have failed to adapt math instruction to current and future needs.

In addition, it says, "broad-brush" reform efforts, such as the push to increase graduation rates, have exacerbated the problems by failing to raise standards for achievement.

To bring about meaningful changes, the academy report urges national leaders to wage a massive campaign to develop new curricular standards; enhance teacher professionalism; design new forms of assessment that meet instructional goals; and push for the creation of a "tradition" of elementary-school math specialists.

Above all, it says, leaders must generate political support, so that such changes can be implemented at the local level.

> *"The basic goal should be to encourage students to think mathematically."*
>
> —Shirley A. Hill

But while the need for reform is "urgent," the report concludes, the prospects for success are good.

"Because of emerging general agreement within the mathematics, mathematics-education, and related professional communities on goals for mathematics education and the means for achieving them," it states, "there is at this time a special opportunity for the nation to push ahead boldly in this area of education."

"It is time to act," the academy concludes.

'A Special Role'

The report issued last week, "Everybody Counts," is the "public preface" to the work of three academy committees charged with studying problems in mathematics education and working to bring about reforms.

"It is not the final report of a commission," the academy's president, Frank Press, notes in a foreword, "but the beginning of a process in which teachers, state and local authorities, and the varied constituencies of mathematics education can draw together in a sustained revitalization effort."

The committees include the Mathematical Sciences Education Board, a 34-member panel of mathematicians and educators focusing on math education at all levels; the Board on Mathematics Education, a 15-member committee studying math research; and the Committee on Mathematical Sciences in the Year 2000, a 21-member group addressing proposals for reforms in undergraduate math instruction.

Over the next few years, the groups expect to issue additional reports on curricular reforms, work with parents, and hold symposia on minority achievement, among other activities.

The report, written by Lynn A. Steen, professor of mathematics at St. Olaf College, notes that while all subjects are important to students' educational and career prospects, math "plays a special role in school education."

Because of the growing importance of science and technology in a technological society, the document argues, mathematical "habits of mind" are increasingly vital to youths' career opportunities.

Moreover, it suggests, an understanding of the subject is an important element in developing general literacy, because of the growing mathematical content of written material, such as newspaper articles.

Properly taught, the report observes, math can inculcate the "power of thought," rather than the "power of authority."

'Raise the Water Table'

These benefits notwithstanding, schools have failed, the study charges, to generate either a sufficient supply of mathematically trained personnel or an adequate level of general mathematical literacy.

Such problems will become more acute in the coming decades, it notes, as the proportion of women and minorities in schools grows. These groups, the report points out, have traditionally been underrepresented in math; yet, by the end of the century, only 15 percent of net new entrants to the labor force will be white males.

"[T]he United States is reasonably successful in tapping and channeling the highly visible talent springs which develop without special support from formal schooling," it states. "But these sources are inadequate to our national need. We must, in addition, raise the entire water table."

Math's 'Revolution'

Schools have been hampered in part, the report suggests, by the erroneous belief among many Americans that performance in the subject is based on innate ability, rather than effort, and by peer pressure that "makes good performance in mathematics socially unacceptable."

But perhaps more importantly, it states, school math has failed to keep pace with changes in mathematical sciences.

"The arithmetic, algebra, geometry, and calculus taught nowadays are mere shadow images of modern mathematics," it states.

The growing use of computers and calculators, together with the increase in mathematical applications in a wide range of fields, the study says, have created a "revolution" in the mathematical sciences "that must be reflected in the schools if our students are to be prepared for tomorrow's world."

To incorporate such changes, teaching in the field must shift from an emphasis on rigid rules and procedures to an approach that encourages students to discover patterns and make conjectures based on observations, the study contends.

"We believe that the 'lecture-and-listen' format that currently predominates in most mathematics classrooms is one reason why so many students are turned off to mathematics early in their lives," Shirley A. Hill, chairman of the academy's math-education board, said at a press conference here.

"We recommend that teachers serve more as class facilitators, moderators, questioners, and coaches than as lecturers," Ms. Hill said. "The basic goal should be to encourage students to think mathematically, rather than simply to memorize mathematical skills without understanding."

Hand-Held Calculators

In addition, the report states, the objectives for math instruction at all levels should shift to reflect present-day and future needs.

In particular, it says, elementary-school instruction should move beyond the traditional focus on "shopkeeper" arithmetic skills to an emphasis on the development of "number sense."

Young people should not only know how to estimate and calculate, it advises, but also how to decide whether to estimate and calculate.

Developing such skills, the academy argues in a proposal likely to be controversial, would require greater use of hand-held calculators.

In addition to exposing young people to tools most adults use routinely, it notes, the use of calculators can also enable children to move beyond simple whole-number computations.

"Many adults fear that early introduction to calculators will prevent children from learning arithmetic 'properly,' as their parents learned it," the report states. "The experiences of many schools during the last 15 years show that this fear is unfounded."

"Students who use calculators," it maintains, "learn traditional arithmetic as well as those who do not use calculators and emerge from elementary school with better problem-solving skills and much better attitudes about mathematics."

High-school math, according to the report, should continue to focus on "the transition from concrete to conceptual mathematics."

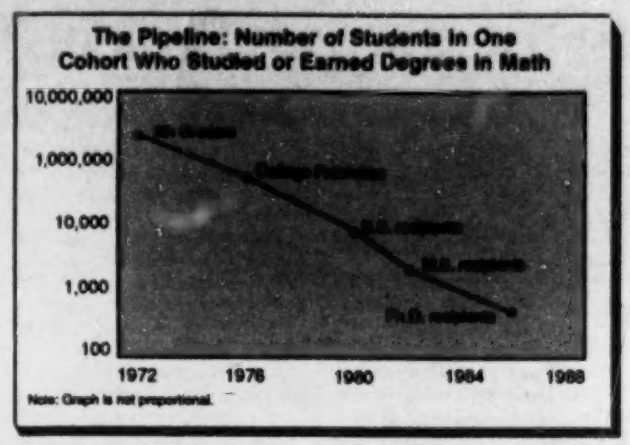
But the secondary curriculum should encompass greater breadth than it currently does, and should help students develop "symbol sense."

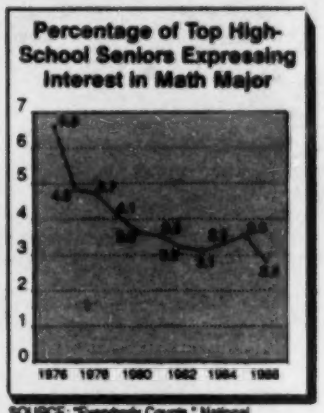
"High-school graduates need to know enough about chance to understand health and environmental risks; enough about data and experiments to understand the grounds for scientific conclusions; enough about representation to interpret graphs; and enough about the nature of mathematics to be supportive parents to their children, who will learn aspects of mathematics that their parents never studied," it concludes.

Reforms in the undergraduate curriculum are the "linchpin" for revitalization efforts, it adds, and should be aimed at producing a new generation of teachers exposed to the instructional styles and course content required for classroom improvements.

"It will no longer do for teachers to teach as they were taught in the paper-and-pencil era," it asserts.

Copies of "Everybody Counts—A Report to the Nation on the Future of Mathematics Education," are available for $7.95 each, with discounts for multiple orders, from the National Academy Press, 2101 Constitution Ave., N.W., Washington, D.C. 20418.





SOURCE: "Everybody Counts," National Research Council, 1989

State Offers Grant for Technology-Based Courses

The California Department of Education is soliciting proposals for an unusual "technology based" curriculum package for middle-school science courses.

The department is offering a $1-million grant to the group that comes up with the best plan for incorporating such technological aids as computers, videocassette recorders, and videodisk players into the teaching of science to 6th-, 7th-, and 8th-grade students.

The group selected would be expected to devote at least $500,000 of its own funds to the project. The curriculum would have to be developed within three years of the awarding of the grant.

"It is expected that the organizations joining in this effort will contribute a major portion of the investment capital and, in return, will receive guidance from the state department," states the request for proposals for "Science 2000: Technology Resources Management Project."

According to Marleen Tucker, a consultant in the office of educational technology, the department "initially thought it would have all the materials to develop [the program] in-house."

Further research indicated, however, that it would have cost up to $10 million to obtain copyright agreements and other requirements.

"It was beyond our means," she said.

So the department is urging private businesses, public broadcasters, local education agencies, colleges and universities, and other parties to put forward proposals that "clearly demonstrate the integration of a non-text-based delivery system."

The request for proposals also stipulates that, "Instructional materials must go beyond drill and practice" to "allow students to explore scientific concepts in depth."

The document calls for a program that encourages students to "perform experiments not normally performed in the classroom, experience new environments, and see visuals that illustrate the inviaible."

State officials plan to test the curriculum in a number of California schools before making it available to teachers.

The deadline for submission of proposals is April 13.

Information about the project is available from the Office of Educational Technology, State Department of Education, P.O. Box 944272, Sacramento, Calif. 94244-2720. —P.W.